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Title:

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Inventor(s): ONUKI MASAHIDE; others: 02



Applicant(s): SUMITOMO RUBBER IND LTD

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### Abstract

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**PURPOSE:**To obtain such a peculiar deformation action that while the title matter is twisted when the same is bent, the same is bent when the same is twisted, by a method wherein a fiber angle of a pipy structural matter is caused to differ partly from that of the other part in a circumferential direction and a part whose fiber angle is different from that of the other part is made into a part of a thicknesswise direction in a part of the circumferential direction.

**CONSTITUTION:**The all fiber angles to be formed with a Z axis are made into an angle of  $\alpha_1=30$  deg. of a positive direction irrespective of r and z of columnar coordinates (r, theta, Z) in a part 11a of FRP constituting a pipy structural matter 11 where  $0 \text{ deg.} \leq \theta < 180 \text{ deg.}$  is given. On the one hand, in a part 11b where  $180 \text{ deg.} \leq \theta < 360 \text{ deg.}$  is given, all angles of fibers F to be formed with the Z axis are made into an angle of  $\beta_1=-30$  deg. of a negative direction. An angle of the fiber F of a part of a circumferential direction of the pipy structural matter 11 to be formed with a geometrical principal axis G is caused to differ from that of a part symmetrical about the geometrical principal axis G. With this construction, a gap is generated between the geometrical principal axis G and an elastic principal axis E in the pipy structural matter 11 by making use of properties of publicly known anisotropy of the FRP.

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